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(71) Applicant:
Robert Bosch GmbH, 7000 Stuttgart, DE

(72) Inventor :
Müller Manfred,
Thiel Andreas,
1000 Berlin, DE

(54) Cerumen protective cap

A well known cerumen protective cap which is removably connected to an ear inserted hearing aid restricts cerumen from entering the acoustic output orifice, it has, however, the disadvantage that the axially parallel orifices for the acoustic output can become clogged with cerumen. Hence, it is the task of the invention to guarantee the unrestricted acoustic input through a cerumen protective cap for a longer time period.
The solution of the task is to ensure that the orifices in the cerumen protective cap are blind holes (17, 18), whereby the first blind hole opens out into a cavity (15) of the Cerumen protective cap (16), and the second blind hole (18) will run into the free space at the cavity located at the opposite end of the cerumen protective cap. A dividing wall (23) between both blind holes contains an acoustic input orifice (24).
The drawing shows a sectional view of the cerumen protection cap and the end of an ear inserted hearing aid from the side of the acoustic output.

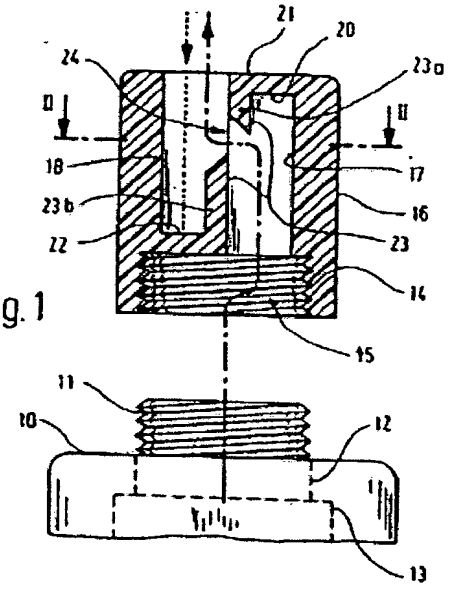

Fig. 1

Description

The invention is based upon a cerumen protective cap according to the preamble of claim 1.

State of the technology

A cerumen protective cap (DE-B2-22 58 118) that features a cavity closed on one side in which a hollow cylindrical acoustic output channel extends at the acoustic receiver, is well-known. Around the cavity the protective cap basically contains parallel orifices towards the acoustic output channel which are connected to the cavity. Even though the established cerumen protective cap restricts cerumen from entering the acoustic output channel of the receiver; it has the disadvantage that their passage orifices clog during the course of the utilization period of the hearing aid with cerumen and thereby restricts the acoustic input.

Task

The invention has the basic task to further develop a cerumen protective cap according to the preamble of claim 1 so that clogging of the passage orifices is restricted to a large extend.

Solution

The task will be solved by a cerumen protective cap according to the preamble of claim 1, through the listed characteristics in the representative part of claim 1. The attainable advantages with this invention consist especially therein that the cerumen is collected at a place where it cannot restrict the sound propagation from the acoustic receiver to the inner ear of the hearing aid carrier.

Description

Execution examples of the invention are illustrated in the drawing by means of several figures and will subsequently be more specifically described.
Illustrated are in
Fig.1 a longitudinal cut through a cylindrical cerumen protective cap in an initial execution form and a view of the acoustic output side end of a hearing aid to be inserted into the ear,
Fig. 2 a sectional view according to the cut deviation II in Fig. 1,
Fig. 3 a cross-sectional view of a cerumen protective cap in a second execution form,
Fig. 4 and 5 a sectional cut and a top view of a disc belonging to the cerumen protective cap according to Fig. 3,
Fig. 6 a sectional view of a disc in a from Fig. 4 modified execution form,
Fig. 7 a sectional view of a cerumen protective cap in a third execution form,
Fig.8 a top view on the cerumen protective cap according to Fig. 7,
Fig.9 a sectional view of a Cerumen protective cap in a fourth execution form,
Fig.10. a sectional view of a disc for a Cerumen protective cap according to fig 9,
Fig. 11 a section from a cerumen protective cap with axially parallel acoustic output orifices and
Fig. 12 a top view to the section according to Fig.11.
In Fig.1, 10 describes an ear inserted hearing aid , which features a tubular thread extension 11 that is connected to a acoustic output channel 12 of the acoustic receiver 13. A respective internal thread fits on the thread extension 14, which surrounds a cavity 15 that is provided on one end of the cylindrical cerumen protective cap 16. The protective cap contains two axially parallel blind holes 17, 18, whereby the first blind hole 17 opens into the cavity 15. The bottom 20 of the first blind hole 17 is located beneath the face side 15 turned away from the cavity 21 of the cerumen protective cap 16. The second blind hole 18 exits into the free space at the face side 21, and the bottom 22 of the second blind hole is located above the cavity 15.
A dividing wall between the axially parallel blind holes 17, 18 contains a acoustic input orifice 24 near the bottom 20 of the first blind hole 17 which is conically tapered from the second blind hole 18 towards the first blind hole 17. The dividing wall 23 preferably consists of two axially parallel one above the other arranged partitions 23a and 23b, whereby between which the sound penetration orifice 24 remains open in between both. The production of the protective cap is simplified by the division of the dividing wall.
The mode of operation of the afore described cerumen protective cap is the following.

When the cerumen protective cap 16 is bolted on the thread extension 11 of the in-ear hearing aid 10, and if a hearing impaired person has inserted the hearing aid with the cerumen protective cap in his acoustic meats, the sound released by the acoustic receiver13 takes the path as illustrated by the dashed line in Fig. 1, i.e. the sound passes through the cavity 15, the first blind hole17, the acoustic output orifice

24, and the second blind hole 18 before it reaches the tympanum of the hearing impaired person. Cerumen which develops in the inner ear of the hearing aid wearer passes through the second blind hole 18 and concentrates on the bottom of this blind hole as illustrated by the dotted line in Fig. 1. The distance from the bottom 22 to the acoustic output orifice 24 is big enough, so that a comparatively large amount of cerumen can be deposited before the acoustic output orifice 24 will become plugged. Hence, the acoustic input is assured for an extended utilization. A sporadically applied cleaning of the cerumen protective cap is sufficient to avoid the disadvantages of a cerumen accumulation. The cerumen protective cap preferably consists of the same material as the hearing aid casing.

By an in Fig. 3 illustrated cerumen protective cap, the first blind hole has the form of an L, whereas the area 32 which corresponds the horizontal leg of the L passes into a cavity 33 and ends in below the second, relatively short blind hole 34. A acoustic input orifice 35 is provided in a dividing wall 36 between the first blind hole 31, and the second blind hole 34. A disc 37 as illustrated in Fig. 4 and 5 can be pushed into the inside thread 38 surrounding the cavity 33 and forms an intermediate bottom with an orifice 39. By this cerumen protective cap it is possible that cerumen accumulates at a bottom 40 of the second blind hole 34 and the disc 37 beneath the first blind hole 31.

In a second execution form of a disc 41 (Fig.6), the part of the disc located beneath the first blind hole 31 increases towards to the longitudinal axis of the cerumen protective cap 30. Thereby, the cerumen which enters the first blind hole 31 is pushed away towards the edge of this blind hole so that it does not enter the cavity 33.

A cerumen protective cap 50 according to Fig. 7 and 8 consists of a tubular part 51, which is divided by a transverse wall 52 into two cavities 53, 54. The lower cavity 53 which is surrounded by an internal thread 55 contains a central acoustic channel 56 which connects both cavities. The acoustic channel is extended by a flanged socket 57 of the transverse wall 52 which extends into the second cavity 54. The flanged socket engages in an additional flanged socket 58 with a larger diameter of a cover 60 which completes the second cavity 54 towards the top. The cover 60 preferably contains four equally divided across the surface arranged radial recesses 61, which are measured in a way, that they surround the in the axial direction located extensions 59 of the flanged socket 51 in axial direction of the cerumen protective cap 50, and that next to each of the extensions 59 one acoustic output orifice 62 remains open. Even though during the use of an in-ear hearing aid provided with the cerumen protective cap 50 the cerumen can enter the inside of the cerumen protective cap 50 trough the acoustic output orifices 62, it will concentrate on a bottom 63 of the upper cavity 54 and cannot reach the acoustic channel 56. According to Fig. 9 and 10, there is a cylindrical cerumen protective cap 70 made from a valvular part 71, the front wall of which 72 is slightly arched. The inside of the front wall has a tubular extension 73. In its upper area, the valvular part contains several, preferably four acoustic output orifices 75, arranged across the circumference. A disc 77 featuring a central orifice 78 and a tubular extension 79 is pressed into the valvular part 70 which has an internal thread 76 on its open side. When the disc 77 is pressed into the internal thread 76, the sound of the acoustic receiver passes through central orifice 78, the flanged socket 73 and out of this through the acoustic output orifices 75 outwards. Cerumen which enters through the acoustic output orifices 75 accumulates on the surface of the disc 77.

In an alternative execution form of the valvular part 70 according to Fig. 9 a valvular part 90 (Fig. 11 and 12) of a cerumen protection cap 91 features axially parallel acoustic output orifices 93, which are preferably slotted and provided in the circular area between a tubular extension 94 and the inside of the valvular part 90.

Patent claims

1. A cerumen protective cap which is removably connected to an ear inserted hearing aid and features axially parallel orifices, as well as a cavity in which a acoustic output connector of the hearing opens out, and which is characterized thereby that the orifices are two blind holes (17, 18) of which a first blind hole (17) opens out into a cavity (15) , and the second blind hole (18) opens out into the free space located at the opposite end of the cerumen protective cap (16), and that a dividing wall (23) which is present between both blind holes contains a acoustic input orifice (24).
2. Cerumen protective cap according to claim 1, thereby characterized that the acoustic input orifice (24) is tapered in the direction from the first blind hole (17) to the second blind hole (18).
3. Cerumen protective cap according to claim 1 or 2, thereby characterized that the acoustic input orifice (24) is arranged near the bottom (20) of the first blind hole (17).
4. Cerumen protective cap according to claim 1, thereby characterized that the dividing wall (23) consists of two axially parallel dividing wall parts (23a, 23b) which are staggered in height in such a way that the acoustic input orifice(24) remains open between them.
5. Cerumen protective cap according to claim 1 or 2, thereby characterized that the first blind hole (31) approximately has the form of an L and that

the area corresponding to the horizontal leg of the L (32) ends beneath the second blind hole (34), and that the fist blind hole (31) is covered by a disc (37) which has been inserted into the cavity (33) and contains an orifice (39) in the extension of the second blind hole (34).

6. Cerumen protective cap according to claim 5, thereby characterized, that the disc (41) has an increasing density towards the edge.
7. Cerumen protective cap according to claim 1 or 2 , thereby characterized that the cerumen protective cap (50) consists of a tubular part (51) with a transverse wall (52) which partitions the inner of the tubular part into two cavities (53, 54) , that the traverse wall contains a central acoustic channel (56) which has been extended by a tubular extension (57) which reached into the second cavity (54),
   And that the tubular extension opens out into a larger in diameter tubular extension (58) which belongs to a cover (60) that covers the second cavity (54) and has at least two radial recesses (61) which in connection with the tubular part (51) form acoustic output orifices (62).
8. Cerumen protective cap according to claim 1 or 2, thereby characterized that the cerumen protective cap (70) consists of a valvular part (71) the inside of which is divided into two cavities by a disc (77), and features a tubular extension (79) surrounding the orifice, which opens out into an additional tubular extension (73) with a larger diameter that is located on the lower surface of the front wall (72) of the valvular part (71) , and that the valvular part (71) beneath the front wall (72) features radial acoustic output orifices (75).
9. Cerumen protective cap according to claim 8, thereby characterized that axially parallel acoustic output orifices (93) which are present between the additional tubular extension (94) and the inside of the valvular part (90) in the front wall (92) are provided instead of the radial acoustic output orifices.
10. Cerumen protective cap according to one of the claims 1 to 9, thereby characterized, that the removable connection between the hearing aid (10) and the cerumen protective cap (16) is a bolt connection (11, 14).

4 page/s drawings pertaining to the text

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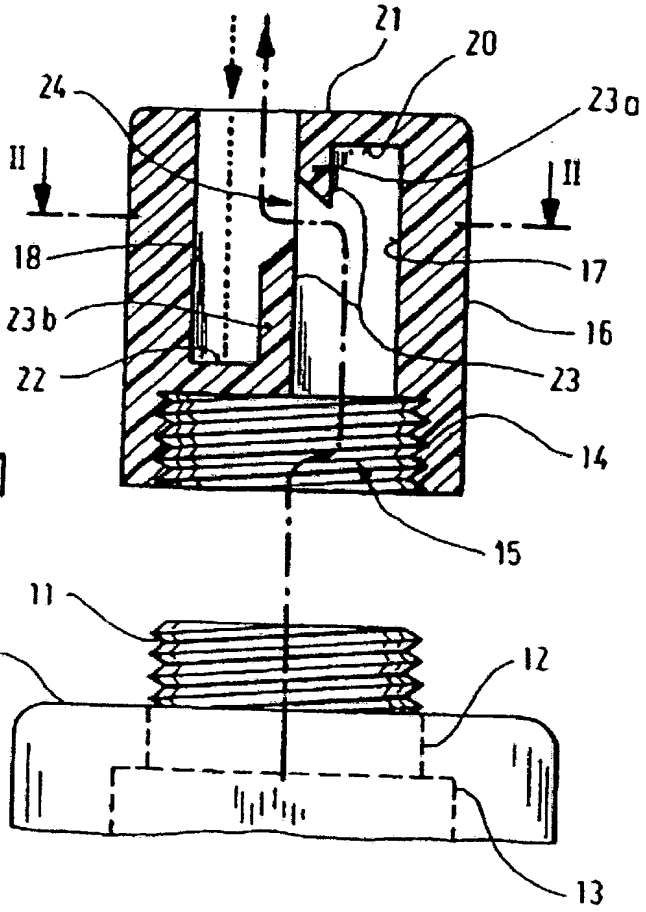

Fig. 1

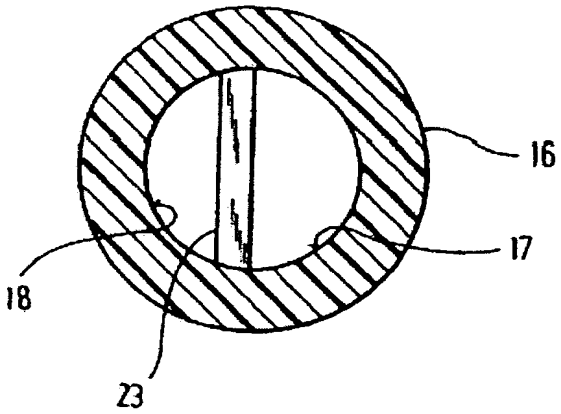

Fig. 2

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Fig. 3

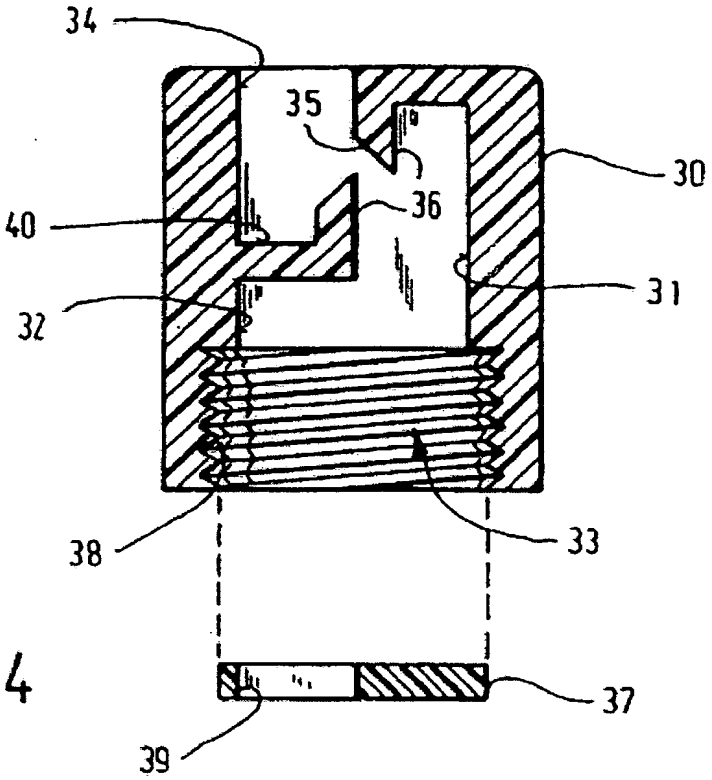

Fig. 4

Fig. 5

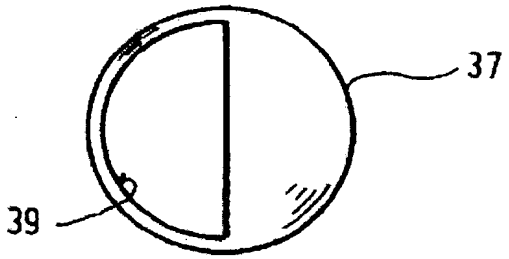

Fig. 6

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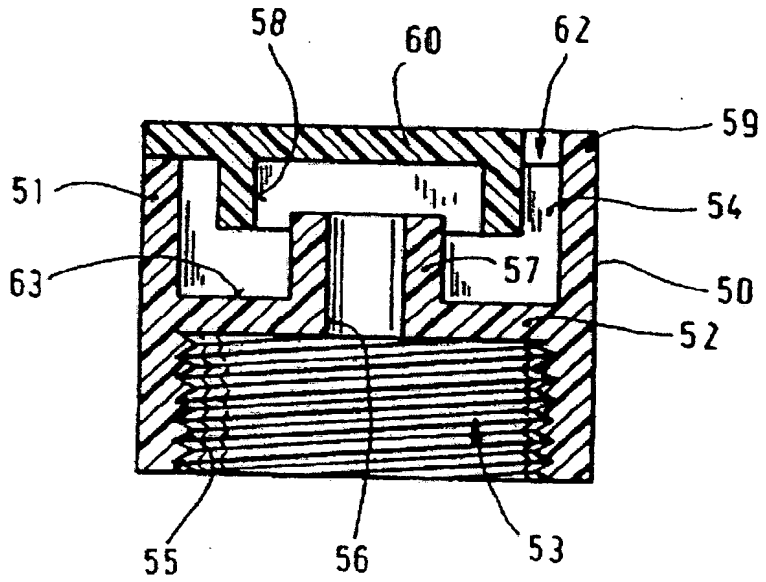
Fig. 7



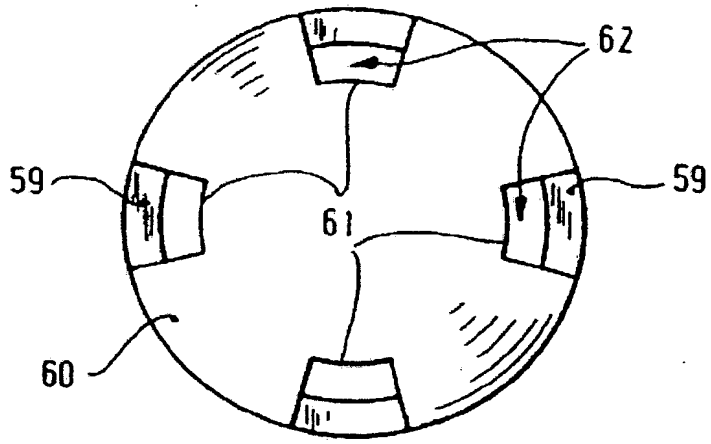


Fig. 8

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Fig. 9

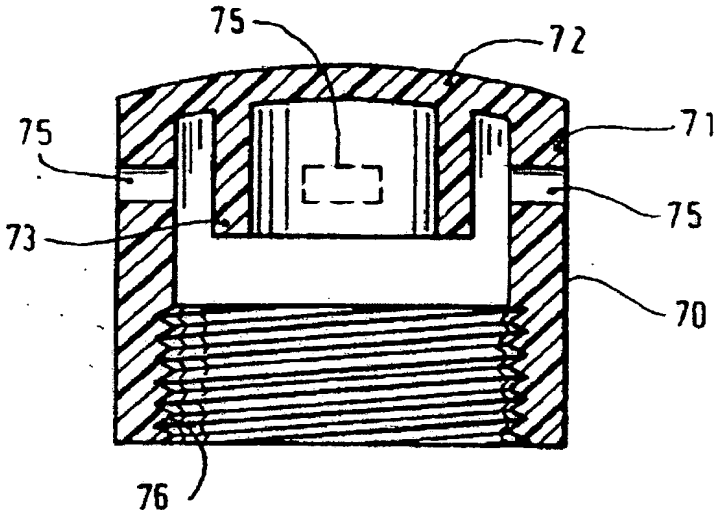

Fig. 10

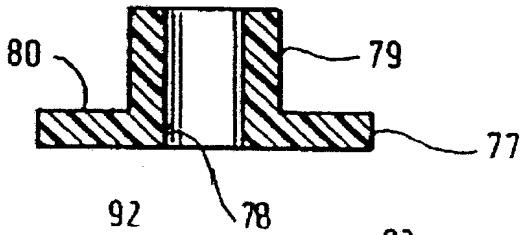

Fig. 11

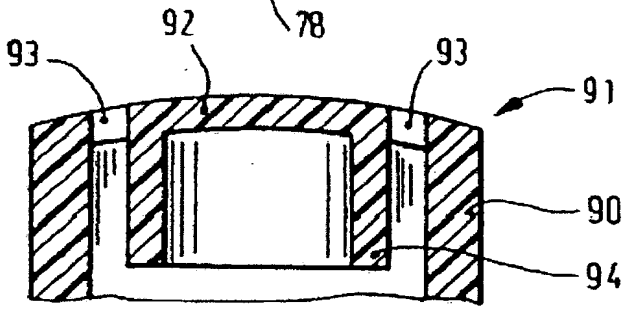

Fig. 12